THE SEGREGATES OF *SENECIO*, S.L., AND *CACALIA*, S.L., IN THE FLORA OF NORTH AMERICA NORTH OF MEXICO

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ABSTRACT

The traditional, broadly conceived genera *Senecio*, s.l., and *Cacalia*, s.l., will be divided into several segregate genera in the forthcoming *Flora of North America North of Mexico*, (FNANM). Provided here are a synoptical key and annotated catalog for the genera, and a nomenclator for the specific and infraspecific epithets for *Senecio*, s.l., and *Cacalia*, s.l., that have been commonly used in North American floristics.

RESUMEN

Los géneros, tradicionalmente concebidos ampliamente, *Senecio*, s.l., y *Cacalia*, s.l., serán divididos en varios géneros segregados en la *Flora of North America North of Mexico*, (FNANM) de próxima aparición. Ofrecemos aquí una clave sinóptica, un catálogo anotado de los géneros y un índice de los epítetos específicos e infraespecíficos de *Senecio*, s.l., y *Cacalia*, s.l., que han sido usados normalmente en las floras norteamericanas.

In 1978, an account of the Senecioneae in North America north of Mexico was published in the North American Flora series (NAF) of The New York Botanical Garden, and therein Barkley (1978) and Pippen (1978), respectively, treated *Senecio* and *Cacalia* in the traditional, inclusive senses that derive from the works of Bentham (1873a, b) and Hoffmann (1892). In so doing, they were in agreement with the floristic botany of North American tradition. Since the time of the NAF publication, new information and rigorous phyletic notions of genera have combined to justify the acceptance of a greater number of more narrowly circumscribed genera. The notions leading to these narrower generic concepts are noted in Bremer (1994) and in several papers that were presented at the Compositae Conference at Kew in the summer of 1994 (Hind & Beentje 1996), particularly the paper by Barkley et al. (1996). Preparation of the treatments of *Senecio*, s.l., and *Cacalia* s.l., for *Flora of North America North of Mexico* (FNANM) has drawn attention to the matters of generic concepts, for a goal of the FNANM is to reflect current understanding as best as possible. In this paper I describe how the native and

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naturalized members of *Senecio*, s.l., and *Cacalia*, s.l., will be treated generically in the FNANM. Included is a key to the genera that are being recognized in the FNANM, an annotated catalog of the genera, plus a list of the species and infraspecific names that have been commonly used in recent floristic works, with their dispositions among the recognized genera.

Some of the genera recognized here are similar to infrageneric groups that have been used in the past, e.g., Bentham (1873 a, b) Greenman (1901), Pippen (1968), and Barkley (1978). What is new in North American floristic work is treating them as genera, rather than as subgenera or sections, or as informal groups within *Senecio*, s.l., or *Cacalia*, s.l. Morphological intergradation among many species of *Senecio*, s.l., has been documented repeatedly (cf. Barkley 1988 for species here treated in *Packera*); so far as I am aware, however, there is no intergradation between any pair of species that are treated here in different genera, i.e., the genera are biologically discrete.

Apart from the small and distinctive subtribe Blennospermatinae Rydb., the Senecioneae appear to be naturally divisable into two evolutionary lineages, the Tussilagininae (Cass.) Dumort. and the Senecioninae (Cass.) Dumort. The distinctions between these two lineages are noted in the first couplet of the key, and they are summarized by Bremer (1994). The Tussilagininae ("tussilaginoids") have been called the "cacalioids" and the "tephroseroids" in the past. Application of the name *Cacalia* has been confusing, with some consensus that it is best used for a group of Eurasian plants that are senecionoid in their affinities. Continued uncertainty about *Cacalia* has led to its formal rejection (Wagenitz 1995; Brummitt 1998), and so referring to the group as "cacalioid" is also rejected.

The key to genera presented here is essentially a synopsis rather than a practical key for identifying a plant-in-hand. No one doubts the biological significance of the first couplet in the key, but the characters used there are impractical for routine plant identification (Barkley et al. 1996). A key for easy identification will need to be a "collective key" that is admittedly artificial and that includes species of several genera. Such a key will be similar in structure to the species keys for *Senecio*, s.l., and *Cacalia*, s.l., in traditional floristic works of the recent past.

KEY TO GENERA

1. Stigmatic areas confluent on adaxial faces of style branches; anther collars cylindrical and cells not inflated; mostly n = 30 or polyploid/dysploid derivatives. (**Tussilagininae**)
2. Shrubs with leaves concentrated distally on branches; AZ, NM. . **1. Barkleyanthus**
2. Herbs with principal leaves basal and on proximal half of stem.
3. Corollas yellow; capitula radiate or discoid.
4. Capitula discoid; phyllaries notably yellow; WY. ..... **2. Yermo**
4. Capitula radiate; phyllaries green or grayish green to dirty white.

5. Principal leaves with blades lanceolate to ovate, pinnately veined and tapering to a winged petiole; boreal, WY and northward. ..... 3. Tephroseris
5. Principal leaves with blades rounded to reniform, plamately or subpalmately veined and abruptly contracted to an unwinged petiole.
6. Flexible, soft herbs, rarely exceeding 3 dm tall; blades of principal leaves 1–2.5 cm across; BC. ..... 4. Sinosenecio
6. Coarse, weakly ligneous herbs to 12 dm tall; blades of principal leaves 8–16(–20) cm across; AZ (NM). ..... 5. Roldana

3. Corollas white, dirty white, or ochroleucous to slightly pinkish or greenish; capitula discoid.
7. Capitulescences elongate, racemiform clusters; Aleutian Islands. ..... 6. Parasenecio
7. Capitulescences flat-topped, corymbiform clusters. Southern half of flora region.
8. Corolla lobes parted the whole length of the limb, the throat indistinct; leaf blades deeply pinnatisect; AZ. ..... 7. Psacalium
8. Corolla lobes separate less than half the length of the limb, the throat cylindrical or funnelform, distinct; leaf blades subentire to merely toothed.
9. Florets 20–40; high Appalachians (above 1400 m) NC, TN. ..... 8. Rugelia
9. Florets 5. Widespread in southeastern quarter of the region, below 1400 m. ..... 9. Arnoglossum

1. Stigmatic areas marginal and distinct on distal, adaxial faces of style branches; anther collars swollen (balusterform) with basal cells inflated; n = (10) 20, or 22–23, or polyploid derivatives (n = 30 in Pericallis). (Senecioninae).
10. Scandent, scrambling vines.
11. Capitula radiate; corollas orange to brick-colored; apices of style branches with distinctive, elongate central appendages; FL. ..... 10. Pseudogynoxys
11. Capitula discoid; corollas yellow; apices of style branches truncate-penicillate; CA. ..... 11. Delairea
10. Plants erect and free standing.
12. Corollas white or dirty white; capitula discoid. ..... 12. Hasteola
12. Corollas variously yellow to orange or anthocyanic, rarely white and then capitula radiate; capitula discoid or radiate.
13. Principal leaves with blades palmately veined and petioles with clasping, stipule-like bases; corollas anthocyanic, sometimes white, or both; capitula radiate; CA. ..... 13. Pericallis
13. Principal leaves with blades not both palmately veined and with expanded-clasping petiole bases; corollas mostly yellow, sometimes orange or ochroleucous, rarely anthocyanic; capitula discoid or radiate; widespread.
14. Herbs with stems arising singly or clustered from a taproot, caudex, or rhizome and with abundant, thin, branching fibrous roots; principal leaves in a basal cluster, cauline leaves progressively reduced distally, margins without conspicuous callose denticles; n = 22 or 23, or polyploid derivatives. ..... 14. Packera
14. Herbs, subshrubs or shrubs of various habits and leaf dispositions, but if herbs with stems arising from a cluster of

basal leaves and with cauline leaves progressively reduced distally, then the roots are fleshy and unbranched and/or the leaf margins have abundant callose denticles; n=(10) 20, or polyploid derivatives. ..... 15. **Senecio** (s. str.)

THE TUSSILAGINOID GENERA

1. **Barkleyanthus** H. Rob. & Brettell

One species; a semi-weedy, hairless shrub that occurs from Honduras northward through Guatemala and Mexico and barely enters the FNANM range in southern Arizona and New Mexico. *Barkleyanthus salicifolius* (H.B.K.) H. Rob. & Brettell was widely known as *Senecio salignus* DC. in the past (Robinson & Brettell 1974). Included in *Senecio* by Barkley (1978).

2. **Yermo** Dorn

One species, *Yermo xanthocephala* Dorn, is known only from barren desert sites in central Wyoming. It was discovered and described in the past decade (Dorn 1991) and its phyletic affinities are not yet well understood. Superficially, it rests easily in the tussilaginoid assemblage. This distinctive species was given a color photograph on the cover of the magazine "Science News" 155(1), January 2, 1999. It was not treated by Barkley (1978) or Pippen (1978).

3. **Tephroseris** Rchb.

A group of some 40–50 boreal and alpine herbs, centered in Eurasia but with at least four species in the FNANM region. The group was revised by Cufodontis (1933), and since his time it has been treated chiefly in floristic studies with differing species concepts (e.g., Barkley 1978; Cody 1996, Hultén 1950 & 1968; Schischkin 1968; Scoggan 1979; Welsh 1974). The taxonomy of the group is complicated by intergradant species and unresolved nomenclatural problems. The species of *Tephroseris* superficially resemble certain species of *Senecio*, s. str., but the microcharacters are clearly tussilaginoid and the basal chromosome number is x=24, a number otherwise unknown in the Senecionoid lineage. Included in *Senecio* by Barkley (1978).

4. **Sinosenecio** B. Nord.

A group of about 30 species of low herbs, mostly of eastern and southeastern Asia, but with a single species in the New World, *Sinosenecio newcombei* (Greene) J.P. Janovec & T.M. Barkley. It is apparently restricted to the Queen Charlotte Islands, British Columbia (Janovec & Barkley 1996). Included in *Senecio* by Barkley (1978).

5. **Roldana** LaLlave

Fifty or more species of coarse herbs, shrubs, and small trees, most of which have broad, palmately or subpalmately veined leaves. The group is centered in the Trans-Mexican Volcanic Belt; it ranges through much of Mexico and

Central America. One species, *Roldana hartwegii* (Benth.) H. Rob. & Brettell, occurs northward to southern Arizona. The genus is under revision by A. Michele Funston. Included in *Senecio* by Barkley (1978).

6. Parasenecio W.W. Sm. & J. Small

A group of about 50 species, centered in eastern Asia, but one species, *Parasenecio auriculata* (A. DC.) J.R. Grant, barely enters the FNANM range on five islands at the western end of the Aleutian Island chain in Alaska. Our plant has been variously included in the past within *Cacalia, Koyamacalia, Ligularia*, or *Parasenecio* (Grant 1993). It was not treated by either Barkley (1978) or Pippen (1978).

7. Psacalium Cass.

About 45 species, mostly in Mexico, but one species, *Psacalium decompositum* (A. Gray) H. Rob. & Brettell, enters the FNANM region in southern Arizona. The group was treated by Pippen (1968), who included our plant in the segregate genus *Odontotrichum*, cf. Robinson and Brettell (1973). Included in *Cacalia* by Pippen (1978).

8. Rugelia R.S. Shuttlew. ex Chapm.

A single species, *Rugelia nudicaulis* Shuttlew. ex Chapm. occurs in the high mountains of central Appalachia along the Tennessee-North Carolina border. It has been treated as *Senecio rugelia* A. Gray in many floristic works of the past, but was included in *Cacalia* by Pippen (1978).

9. Arnoglossum Raf.

Eight species of tall herbs of the southeastern quarter of the FNANM region. They form the traditional core of *Cacalia*, as that genus has been conceived in North American floristics. A new species was recently described by Anderson (1998). Included in *Cacalia* by Pippen (1978).

THE SENECIONOID GENERA

10. Pseudogynoxys (Greenm.) Cabrera

A dozen or so species; scandent, scrambling vines with showy, orange or brick-colored corollas. They are native to the Caribbean region and southward as far as eastern Brazil. They are cultivated as ornamentals, and one species, *Pseudogynoxys chenopodioides* (Kunth) Cabrera, escapes from cultivation and persists in southern Florida and perhaps elsewhere along the Gulf Coast. It has been called *Senecio confusus* Britten in floristic works and the horticultural literature. The group was catalogued and a key was presented by Robinson and Cuatrecasas (1977), but the relationships among the species remain poorly understood and a revision is needed. Included in *Senecio* by Barkley (1978).

11. Delairea Lem.

One species; a scandent vine, *Delairea odorata* Lemaire, is native to southern Africa but is now established as an aggressive weed in coastal California. This plant has been known as *Senecio mikanioides* Otto, and was included in *Senecio* by Barkley 1978.

12. Hasteola Raf.

Two species; one is of the east-central U.S and the other was recently described from Florida. These plants have eradiate capitula and white corollas, which places them in the traditional concept of *Cacalia*, but they have the microcharacters and cytology of the Senecionoid lineage, cf. Anderson (1994). Included in *Cacalia* by Pippen (1978).

13. Pericallis D. Don

About a dozen species; native to the Canary Islands, Madeira, and the Azores, and some species are ancestral to the horticultural complex called "the florists' cineraria." A cultivar from the complex escapes and persists in favored sites in coastal California. Under current taxonomic concepts our plant is best treated as *Pericallis hybrida* B. Nord., but it has been widely known in the past as *Senecio cruentus* DC. *Pericallis* is alone among the Senecionoid genera in having n = 30, a number that is typical of the Tussilaginoid lineage. In all other characters, however, it fits comfortably among the Senecionoids (Nordenstam 1977, 1978). Included in *Senecio* by Barkley (1978).

14. Packera Á. Löve & D. Löve

About 60 species; centered in the western temperate half of North America but extending into southern Mexico and into the Arctic. Two arctic-alpine species extend into northern Siberia and central Asia. . The group has been known as the "aureoid complex" of *Senecio*, s.l., and although its members are superficially similar to many species of *Senecio*, it forms a distinct lineage. Intergradation among *Packera* species is well known (Barkley 1988), but there is no morphological intergradation or putative hybridization between any *Packera* and any species of *Senecio*, s.str., or segregate of *Senecio*. In addition to the characters used in the key, *Packera* is further distinguished from *Senecio* by having pollen grains of a helianthoid ultrastructural type rather than of a senecionoid type (Bain & Walker 1995). An ITS-based phylogeny has been estimated for *Packera* by Bain and Jansen (1995). Included in *Senecio* by Barkley (1978).

15. Senecio L.

Senecio, in the broadest sense, is a nearly world wide genus of some 3,000 species, and even after the exclusion of the currently accepted segregates, it still encompasses some 1,300 species. Clearly, *Senecio*, s.str., is a "mixed bag"

that is defined largely as what remains after the rather precisely circumscribed segregate genera are removed. It includes numerous species of unknown affinity, and presumably the concept of "Senecio" will change as more is learned about the relationships of the currently included species. About 50 species of *Senecio*, s.str., occur in the FNANM region; some are native, some are introduced, and a few are notable weeds.

SENECIO AND *CACALIA* NAMES OF TRADITIONAL USE IN NORTH AMERICAN FLORISTICS AND THEIR DISPOSITION IN THE FNANM

Epithets with no alternative name remain as listed

SENECIO

actinella Greene
amplectens A. Gray
  var. *amplectens*
  var. *holmii* (Greene) H.D. Harr.
ampullaceus Hook.
anonymus A.W. Wood ≡ *Packera anonyma* (A.W. Wood) W.A. Weber & Á. Löve
antennariifolius Britton ≡ *Packera antennariifolia* (Brirron) W.A. Weber & Á. Löve
aphanactis Greene
arizonicus Greene
aronicoides DC.
astephanus Greene
atratus Greene
atropurpureus (Ledeb.) Fedtsch. ≡ *Tephroseris atropurpurea* (Ledeb.) Holub subsp. *atropurpurea*
  var. *frigidus* ≡ *T. a.* subsp. *frigida* (Richardson) Á. Löve & D. Löve
  var. *tomentosus* (Kjellm.) Hulrén = *Tephroseris kjellmanii* (A.E. Porsild) Holub
aureus L. ≡ *Packera aurea* (L.) Á. Löve & D. Löve
bernardinus Greene ≡ *Packera bernardina* (Greene) W.A. Weber & Á. Löve
bigelovii A. Gray
  var. *bigelovii*
  var. *hallii* A. Gray
blochmaniae Greene
bolanderi A. Gray ≡ *Packera bolanderi* (A. Gray) W.A. Weber & Á. Löve
  var. *bolanderi*
  var. *harfordii* (Greenm.) T.M. Barkley ≡ *P. b.* var. *harfordii* (Greenm.) D.K. Trock & T.M. Barkley
breweri Burtt = *Packera breweri* (Burtt Davy) W.A. Weber & Á. Löve
californicus DC.
cannabifolius Less.
canus Hook. = *Packera cana* (Hook.) W.A. Weber & Á. Löve
cardamine Greene ≡ *Packera cardamine* (Greene) W.A. Weber & Á. Löve
castoreus S.L. Welsh (a *Packera?*)
clarkianus A. Gray
clevelandii Greene ≡ *Packera clevelandii* (Greene) W.A. Weber & Á. Löve
confusus Britten = *Pseudogynoxys chenopodioides* (Kunth) Cabrera
congestus (R.Br.) DC.
conterminus Greenm. ≡ *Packera contermina* (Greenm.) J.F. Bain

crassulus A. Gray
crocatus Rydb. ≡ *Packera crocata* (Rydb.) W.A. Weber & Á. Löve
cruentus DC. = *Pericallis hybrida* B. Nord.
cymbalaria Pursh ≡ *Packera cymbalaria* (Pursh) W.A. Weber & Á. Löve
cymbalarioides Buek ≡ *Packera buekii* D.K. Trock & T.M. Barkley
cynthioides Greene ≡ *Packera cynthioides* (Greene) W.A. Weber & Á. Löve
debilis Nutt. ≡ *Packera debilis* (Nutt.) W.A. Weber & Á. Löve
dimorphophyllus Greene ≡ *Packera dimorphophylla* (Greene) W.A. Weber & Á. Löve
  var. *dimorphophylla*
  var. *intermedius* T. Barkley ≡ *P. d.* var. *intermedia* (T.M. Barkley) D.K. Trock & T.M. Barkley
  var. *paysonii* T. Barkley ≡ *P. d.* var. *paysonii* (T.M. Barkley) D.K. Trock & T.M. Barkley
douglasii DC. = *Senecio flaccidus* Less.
  var. *douglasii* ≡ *S. f.* var. *douglasii* (DC.) B.L. Turner & T.M. Barkley
  var. *longilobus* (Benth.) L.D. Benson = *S. f.* Less. var. *flaccidus*
  var. monoensis (Greene) Jeps. ≡ *S. f.* var. *monoensis* (Greene) B.L.Turner & T.M. Barkley
elegans L.
elmeri Piper
eremophilus Richardson
  var. *eremophilus*
  var. *kingii* (Rydb.) Greenm.
  var. *macdougallii* (A. Heller) Cronquist
ertterae T.M. Barkley
eurycephalus Torr. & A. Gray ≡ *Packera eurycephala* (Torr. & A. Gray) W.A. Weber & Á. Löve
  var. *eurycephala*
  var. *lewisrosei* (J.T. Howell) T.M. Barkley ≡ *P. eurycephala.* var. *lewisrosei* (J.T. Howell) J.F. Bain
fendleri A. Gray ≡ *Packera fendleri* (A. Gray) W.A. Weber & Á. Löve
flaccidus Less.
  var. *flaccidus*
  var. *douglasii* (DC.) B.L. Turner & T.M. Barkley
  var. *monoensis* (Greene) B.L. Turner & T.M. Barkley
flettii Wiegand ≡ *Packera flettii* (Wiegand) W.A. Weber & Á. Löve
foetidus Howell = *Senecio hydrophiloides* Rydb.
foetidus var. *hydrophiloides* (Rydb.) T.M. Barkley ex Cronquist ≡ *Senecio hydrophiloides* Rydb.
franciscanus Greene ≡ *Packera franciscana* (Greene) W.A. Weber & Á. Löve
fremontii Torr. & A. Gray
  var. *fremontii*
  var. *blitoides* (Greene) Cronquist
  var. *occidentalis* A. Gray
  var. *inexpectatus* Cronquist
frigidus Less. ≡ *Tephroseris atropurpurea* subsp. *fridiga* (Richardson) Á. Löve & D. Löve
fuscatus Hayek = *Tephroseris lindstroemii* Á. Löve & D. Löve
ganderi T.M. Barkley & R.M. Beauch. ≡ *Packeri ganderi* (T.M. Barkley & R.M. Beauch.) W.A. Weber & Á. Löve
glabellus Poir. *Packera glabella* (Poir.) C. Jeffrey
greenei A. Gray ≡ *Packera greenei* (A. Gray) W.A. Weber & Á. Löve
hartianus A. Heller ≡ *Packera hartiana* (A. Heller) W.A. Weber & Á. Löve
hartwegii Benth. ≡ *Roldana hartwegii* (Benth.) H. Rob. & Brettell
hesperius Greene ≡ *Packera hesperia* (Greene) W.A. Weber & Á. Löve
huachucanus A. Gray ≡ *Senecio multidentatus* var. *huachucanus* (A. Gray) T.M. Barkley

hydrophiloides Rydb.
hydrophilus Nutt.
hyperborealis Greenm. ≡ *Packera hyperborealis* (Greenm.) Á. Löve & D. Löve
imparipinnatus Klatt = *Packera tampicana* (DC.) C. Jeffrey
indecorus Greene ≡ *Packera indecora* (Greene) Á. Löve & D. Löve
integerrimus Nutt.
  var. *integerrimus*
  var. *exaltatus* (Nutt.) Cronquist
  var. *major* (A. Gray) Cronquist
  var. *ochroleucous* (A. Gray) Cronquist
  var. *scribneri* (Rydb.) T.M. Barkley
ionophyllus Greene ≡ *Packera ionophylla* (Greene) W.A. Weber & Á. Löve
jacobaea L.
kjellmanii A.E. Porsild ≡ *Tephroseris kjellmanii* (A.E. Porsild) Holub
layneae Greene ≡ *Packera layneae* (Greene) W.A. Weber & Á. Löve
lemmonii A. Gray
lindstroemii A.E. Porsild ≡ *Tephroseris lindstroemii* (A.E. Porsild) Á. Löve & D. Löve
lugens Richardson
lyonii A. Gray
macounii Greene ≡ *Packera macounii* (Greene) W.A. Weber & Á. Löve
malmstenii S.F. Blake ex Tidestr. (a *Packera ?*)
megacephalus Nutt.
mikanioides Otto ex Walpers = *Delairea odorata* Lem.
millefolium T.& G. ≡ *Packera millefolia* (Torr. & A. Gray) W.A. Weber & Á. Löve
millelobatus Rydb. ≡ *Packera millelobata* (Torr. & A. Gray) W.A. Weber & Á. Löve
mohavensis A. Gray
moreshiensis (Calder & R.L. Taylor) G.W. Douglas & G. Ruyle-Douglas ≡ *Packera moreshiensis.* (Calder & R.L. Taylor) J.F. Bain
multicapitatus Greenm. ≡ *Senecio spartioides* var. *multicapitatus* (Greenm.) S.L. Welsh
multidentatus var. *huachucanus* (A. Gray) T.M. Barkley
multilobatus Torr. & A. Gray ex A. Gray ≡ *Packera multilobata* (Torr. & A. Gray ex A. Gray) W.A. Weber & Á. Löve
musiniensis S.L. Welsh (a *Packera ?*)
neomexicanus A. Gray ≡ *Packera neomexicana* (A. Gray) W.A. Weber & Á. Löve
  var. *neomexicanus* ≡ *P. n.* var. *neomexicana*
  var. *metcalfei* (Greene) T.M. Barkley ≡ *P. n.* var. *metcalfei* (Greene) D.K. Trock & T.M. Barkley
  var. *mutabilis* (Greene) T.M. Barkley ≡ *P. n.* var. *mutabilis* (Greene) W.A. Weber & Á. Löve
  var. *tournevi* (Greene) T.M. Barkley ≡ *P. n.* var. *tournevi* (Greene) T.M. Barkley & D.K. Trock
neowebsteri S.F. Blake
newcombei Greene ≡ *Sinosenecio newcombei* (Greene) J.P. Janovec & T.M. Barkley
obovatus Muhl. ex Willd. ≡ *Packera obovata* (Muhl.ex Willd.) W.A. Weber & Á. Löve
ogotorukensis Packer ≡ *Packera ogotorukensis* (Packer) W.A. Weber & Á. Löve
parryi A. Gray
pattersonensis Hoover
pauciflorus Pursh ≡ *Packera pauciflora* (Pursh) W.A. Weber & Á. Löve
pauperculus Michx. ≡ *Packera pauperculа* (Michx.) W.A. Weber & Á. Löve
plattensis Nutt. ≡ *Packera plattensis* (Nutt.) W.A. Weber & Á. Löve

porteri Greene ≡ *Packera porteri (Greene)* C. *Jeffrey*
pseudaureus Rydb. ≡ *Packera pseudaurea* (Rydb.) W.A. Weber & Á. Löve
var. *pseudaureus* ≡ *P. p.* var. *pseudaurea*
var. *flavulus* (Greene) Greenm. ≡ *P. p.* var. *flavula* (Greene) W.A. Weber & Á. Löve
var. *semicordatus* (Mack. & Bush) T.M. Barkley ≡ *P. p.* var. *semicordata*us (Mack. & Bush) T.M. Barkley & D.K. Trock
pseudo-arnica Less.
pudicus Greene
quaerens Greene ≡ *Packera quaerens* (Greene) W.A. Weber & Á. Löve
quercetorum Greene ≡ *Packera quercetorum* (Greene) C. Jeffrey
rapifolius Nutt.
resedifolius Less. = *Packera cymbalaria* (Pursh) W.A. Weber & Á. Löve
riddellii Torr. & A. Gray
robbinsii Oakes ex Rusby = *Packera schweinitziana* (Nutt.) W.A. Weber & Á. Löve
rugelia A. Gray ≡ *Rugelia nudicaulis* Shutlew. ex Chapm.
sacramentanus Wooton & Standl.
salignus DC. = *Barkleyanthus salicifolius* (Kunth) H. Rob. & Brettell
sanguisorboides Rydb. ≡ *Packera sanguisorboides* (Rydb.) W.A. Weber & Á. Löve
schweinitzianus Nutt. ≡ *Packera schweinitzianus* (Nutt.) W.A. Weber & Á. Löve
scorzonella Greene
serra Hook.
var. *serra*
var. *admirabilis* (Greene) A. Nelson
sheldonensis A.E. Porsild
smallii Britt. = *Packera anonyma* (A.W. Wood) W.A. Weber & Á. Löve
soldanella A. Gray
spartioides Torr. & A. Gray
var. *spartioides*
var. *multicapitatus* (Greenm.) S.L. Welsh
spellenbergii T.M. Barkley ≡ *Packera spellenbergii* (T.M. Barkley) C. Jeffrey
sphaerocephalus Greene
streptanthifolius Greene ≡ *Packera streptanthifolia* (Greene) W.A. Weber & Á. Löve
subnudus DC. ≡ *Packera bnekii* D.K. Trock & T.M. Barkley
sylvaticus L.
tampicanus DC. = *Packera tampicana* (DC.) C. Jeffrey
taraxacoides (A. Gray) Greene
tomentosus Michx. ≡ *Packera tomentosa* (Michx.) C. Jeffrey
triangularis Hook.
tridenticulatus Rydb. ≡ *Packera tridenticulata* (Rydb.) W.A. Weber & Á. Löve
viscosus L.
vulgaris L.
warnockii Shinners
werneriifolius A. Gray ≡ *Packera werneriifolia* (A. Gray) W.A. Weber & Á. Löve
wootonii Greene
yukonensis A.E. Porsild ≡ *Tephroseris yukonensis* (A.E. Porsild) Holub

CACALIA

atriplicifolia L. ≡ *Arnoglossum atriplicifolium* (L.) H. Rob.
auriculata DC. ≡ *Parasenecio auriculata* (DC.) J.R. Grant
decomposita A. Gray ≡ *Psacalium decompositum* (A. Gray) H. Rob. & Brettell

diversifolia Torr. & A. Gray ≡ *Arnoglossum diversifolium* (Torr. & Gray) H. Rob.
floridana A. Gray ≡ *Arnoglossum floridanum* (A. Gray) H. Rob.
muehlenbergii Sch.Bip. = *Arnoglossum reniforme* (Hook.) H. Rob.
ovata Walt. ≡ *Arnoglossum ovatum* (Walter) H. Rob.
plantaginea (Raf.) Shinners ≡ *Arnoglossum plantagineum* Raf.
rugelia (Shuttlew. ex Chapm.) T. Barkley & Cronquist ≡ *Rugelia nudicaulis* Shuttlew. ex Chapm.
suaveolens L. ≡ *Hasteola suaveolens* (L.) Pojark.
sulcata Fernald ≡ *Arnoglossum sulcatum* (Fernald) H. Rob.

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